A STUDY OF CHANGES IN THE FARM BUSINESS IN THE ATHABASKA AREA OF NORTHERN ALBERTA, 1945 - 1951

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K. Elgaard 1/

INTRODUCTION

This study is an extension of a series of economic investigations dealing with land settlement problems in the woodland areas of Alberta.2/ The earlier studies of this series were undertaken during the years from 1941 to 1945 and were part of a broader enquiry into the economic and social problems arising out of the present use of land in Western Canada. More specifically, these studies examined: (1) the pattern of development of farms in settlement areas, (2) the minimum farm capital requirements to provide an adequate level of farm income for farm living and savings, and(3) the progress made by the settlers.

The earlier studies of land settlement were primarily designed to provide information on the agricultural possibilities of northern Alberta. It was anticipated that there would be an increased demand for land during the immediate postwar period and that part of this demand would have to be met by opening up new lands to settlement. It was also apparent that the era of haphazard settlement was over and that the success of controlled settlement would require firsthand information of pioneering experiences. Such data would aid in the choice of suitable settlement areas and in the formulation and administration of sound policies under which settlement should proceed.

1/ Economics Division, Canada Department of Agriculture, University of Alberta, Edmonton. The field survey, made during the summer of 1951, was directed by H.K. Scott who was assisted in assembling the farm business data by H.L. Sharpe, W.F. Thomson and K. Elgaard.

2/ These investigations were undertaken by the Economics Division, Marketing Service, Canada Department of Agriculture in co-operation with the Department of Political Economy, University of Alberta. The studies were reported in the following publications: Pioneer Farming and Municipal Finance in the Sangudo-Winfield Area of Alberta, 1941, B.K. Acton and C.C. Spence, Publication 791, Canada Department of Agriculture; A Study of Pioneer Farming in the Fringe Areas of the Peace River, Alberta, 1942, B.K. Acton and C.C. Spence, Publication 792, Canada Department of Agriculture; Land Settlement in Northeastern Alberta, 1943, B.H. Kristjanson and C.C. Spence, Publication 800, Canada Department of Agriculture; A Study in Farming on Bushlands at Athabasca, Alberta, 1945, B.K. Acton, Processed Publication, Canada Department of Agriculture; Farming on Bushlands at Debolt-Peace River, Alberta, 1945, B.K. Acton, Processed Publication, Canada Department of Agriculture.

The present study is one of the most recent studies dealing with land settlement problems in Alberta.1/ It refers particularly to the Athabasca area and covers the postwar period from 1945 to 1951.2/ This period was characterized by much greater changes in farming conditions than those which took place during the period covered by the earlier settlement reports. From 1945 to 1951, the prices of agricultural products and prices of commodities and services used by the farmer both made large gains. There were changes in the relative prices of farm products, in the relative costs of factors used, and in government policy, which encouraged changes in the production pattern. Supplies of farm machinery and building materials were more readily available in the later period than previously but there was little change in the poor labour supply situation. Crop yields in the area studied were above average in 1944 and very low in 1950 and the average crop yields for the six-year period under study were slightly below the long term average.

What problems have arisen from these changing conditions to affect the possibilities of new settlement in northern Alberta? How have these varying conditions affected farm organization and the farm business? Have these new conditions encouraged a change in the size of farm? Has land use and the combination of enterprises been affected? What has been the effect on the financial returns to the operator? Has a substitution of capital for labour taken place and has labour thereby become more efficient? Does the size of farm compare favourably with the minimum requirements to assure a reasonable level of living? Has there been a change in the level of living or has the rate of capital formation adversely affected the level of living? This study represents an attempt to throw some light on these problems and provide an answer to these and other questions.

Method of Study

Most of the information presented in this report was collected by the field survey method. Two surveys of typical farm businesses were undertaken in the summers of 1945 and 1951.

Data relating to the various aspects of the farm business were obtained in 1951 from 37 farm operators who had also been interviewed in 1945. An analysis of the data obtained in both years makes possible a study of progress or various other changes which have taken place during the six-year interval.

1/ During the summer of 1951 one other study was made of the farm business in settlement areas of northern Alberta. The area covered by this study was in the vicinity of High Prairie.

2/ The present study is also part of a larger project designed to analyze alternative developments in the proposed extensions of irrigation areas and in new areas on the northern fringe of settlement.

CHARACTERISTICS OF THE STUDY AREA

Physical Features

The area studied was included within Local Improvement Districts 696 and 697, now incorporated within Municipal District 122. The area is located across the Athabasca River from the town of Athabasca, 100 miles north of Edmonton. The Athabasca River at this point forms an elbow in its northerly course, bounding the surveyed area on three sides. The survey area comprised townships 67, 68 and 69, in ranges 21, 22 and 23, west of the fourth meridian.

The area is drained by the Athabasca River, which eventually flows into the Arctic Ocean. With the exception of Deep Creek, the topography is level to undulating. Deep Creek traverses the northeast part of the district, and has cut a fairly deep channel in reaching the Athabasca River.

The soil is grey wooded and of medium texture. There are, however, frequent sand and gravel ridges unsuited to cultivation. Muskegs are numerous and vary in size. A medium brush cover of second growth poplar is common to the lands suitable for farming. Woodland grasses grow throughout the woods, but these are not highly nutritious for feeding.

The climate of the Athabasca district is generally characterized by bright, moderately warm summer days, and a bright, dry, cold winter. In many respects it is similar to the climate at Edmonton, although somewhat more severe. The average annual precipitation is between 17 and 18 inches with about two-thirds of the moisture coming during the growing season. Seldom does the average annual precipitation fall below 12 inches. The length of the growing season 1/ for the district is shorter than at Edmonton and is about 100 days.

Settlement and Population

Agricultural settlement in the Athabasca region commenced about 1906. There was no extensive settlement, however, until the Canadian Northern Railway was built from Edmonton in 1912. Another wave of settlement occurred with an influx of Central Europeans in 1928 and 1929. The rural population in Local Improvement Districts 696 and 697 reached a peak of 869 persons in 1941 but had declined to 802 in 1951 (Table 2).

The total number of farms in Local Improvement Districts 696 and 697 increased from 97 in 1916 to 230 in 1951. At the same time occupied acreage increased from 174 to 278 acres per farm. The proportion considered arable by resident farmers is about 80 per cent of total occupied acreage. Improved land increased from 13 per cent of occupied acreage

1/ Growing season is the approximate average period between three degrees of frost (29 degrees F.) in spring and fall.

in 1916 to 38 per cent in 1946. The rate of land improvement amounted to about 2.5 acres per farm per year until 1926, about one acre per year during the thirties and about 3.5 acres per year during World War II.

Table 1.- Period of Settlement, 37 Farm Operators in the Athabasca Area, Alberta.

Period	Number	Per Cent
1912-1913	5	14
1928-1929	17	46
1936-1944	15	40
Total	37	100

Table 2.- Rural Population, Number of Farms, Occupied Acreage and Improved Acreage, Local Improvement Districts 696 and 697, Alberta, 1916-51

Year	Rural Population	Number of Farms	Occupied Acreage per Farm	Improved Acreage per Farm
1916	302	97	174	22
1921	323	97	191	34
1926	322	80	200	47
1931	643	165	215	51
1936	784	184	216	55
1941	869	192	222	70
1946	806	192	234	88
1951	802	230	278	a/

a/ Information not yet available.
Source: Census of Canada and Census of the Prairie Provinces.

In the summer of 1951 the two southern sections of township 70 within the elbow of the Athabasca River were opened to settlement by the Provincial Government. These lands which had previously been closed to settlement amount to about 50 square miles.

Birthplace of Farm Operators.- Approximately two-thirds of the 37 farm operators included in the study were born in Poland and the Ukraine. The birthplace of the remainder of the farm operators was Britain, Germany and the Scandinavian countries. In 1951 these farmers had owned their farms for an average 19 years; their average age was 52 years.

Services and Industries

The town of Athabasca provides most of the services necessary to a rural population. For additional requirements farmers go directly to Edmonton, which is readily accessible either by way of a 100-mile, all-weather road or by a branch line of the Canadian National Railway that

terminates at Athabasca.

Athabasca is an incorporated town with a population of slightly more than 1,000 people. It provides the usual services found in most small towns, such as general stores, elevators and livestock shipping facilities. A Provincial Government office is maintained in Athabasca, from which a District Agriculturist, a Municipal Inspector, a Household Economist, and a Forestry Official deal with educational and administrative problems in the area. A new hospital, high school, highway and bridge have recently been constructed. The new bridge will be of great service to settlement north of the Athabasca River and to any further settlement taking place in that area. Previously, settlers north of the river had access to shipping and market facilities only by way of a ferry.

Lumbering is an industry of considerable importance, although there are no big lumber companies operating in the area. There are numerous small mills, some of which are co-operatively owned by the settlers. Fishing is carried on in such lakes to the north as Calling Lake; the catch, mostly whitefish, is shipped to outside markets from Athabasca. Athabasca is also the equipment headquarters for many people who have registered trap lines far to the north. In general, Athabasca services a mixed farming community, and small industries such as lumbering, fishing and trapping.

CHANGES IN FARM ORGANIZATION

Changes in the relative prices of farm products, which are governed in part by government agricultural policy, and changes in relative farm costs, are major factors affecting farm organization. Changes in farm organization may also be the effect of other factors such as a period of years of either poor crop yields or above average crop yields. In the Athabasca area, changes in farm organization will be examined on the basis of the average changes made by the group of 37 farms in the sample study.

Land Acquisition and Tenure

All 37 farmers were land owners in 1944; there were no renters and only one part owner. In 1950 there were three part owners, each one having a homestead lease apart from owning the home quarter. The remainder were owners.

By 1950, 56 parcels of land had been acquired by the farmers in the sample: 23 parcels had been acquired by the homestead method, three by homestead lease, 26 by purchase and three by legacy and one for which information was not available. Although homesteading was the common method of first acquiring land during settlement, much of the land has since changed hands by sale and purchase.

Type and Size of Farm

Certain changes were noted to have taken place in the combination of enterprises on farms in the Athabasca area. A significant decrease in the average size of the livestock enterprise occurred during the period under study. There was also a trend to greater production of specialty crops such as sweet clover and alfalfa seed. In general, the predominant type of farm in the area is a grain-legume seed combination.

The average size of farm increased from 210 acres in 1944 to 238 acres in 1950. Farms ranged in size from one to three quarter sections. Changes in the distribution of farm sizes for the period under study are shown in Table 3.

Table 3.- Size of Farm by Quarter Sections, 37 Farms in the Athabasca Area, Alberta, 1944 and 1950

Number of Quarter-sections	Number of Farms		Per Cent	
	1944	1950	1944	1950
One	26	18	70	48
Two	10	17	27	46
Three	1	2	3	6
Total	37	37	100	100

Farmers also succeeded, from 1944 to 1950, in clearing and breaking a considerable portion of new land for cultivation. The average acreage in improved land increased by 58 acres, or by 62 per cent of the 1944 acreage. This constitutes a rate of increase of 9.6 acres per farm per year. Improved land represented 44 per cent of the total occupied acreage in 1944 and 63 per cent in 1950.

The increase in improved land includes the land acquired by purchase. Of the 37 farmers interviewed only one decreased, and eight increased the size of their farm units. The 28 other farms did not change in size but their acreage of improved land increased by 43 acres per farm, on the average; this represents an increase of 7.2 acres per farm per year. The proportion in improved land was 46 per cent in 1944 and 66 per cent in 1950.

Land improvement has taken place at about double the rate prevailing in the ten years preceding 1944. The greatest increase occurred on those farms whose cropland acreages were smallest in 1944. Dividing the 37 farms into two groups by size of cropland acres (above and below the median) the smaller farms were found to have increased their cultivated land by 71 acres and the larger farms by 39 acres (Table 4).

Table 4.- Increases in Cropland Acreage, 37 Farms in the Athabasca Area, Alberta, 1944 and 1950

	Unit	70 Acres and Less	More than 70 Acres
Number of farms	number	19	18
Cropland acreage:			
1944	acres	53	129
1950	acres	124	168
Increase	acres	71	39
Unimproved land (1950)	acres	69	108
Per cent arable a/	per cent	54	59

a/ Farmers' estimates in 1950.

Land Utilization

The changes in size and type of farm were accompanied by changes in the use made of the land. These changes in land use are shown in Table 5.

Table 5.- Land Utilization, 37 Farms in the Athabasca Area, Alberta, 1944 and 1950

	Acres		Per Cent	
	1944	1950	1944	1950
Cultivated land	90	145	100	100
Wheat	21	47	23	32
Oats	22	14	24	9
Barley	3	13	4	9
Other grains	2	1	2	1
Alfalfa seed	2	10	2	6
Sweet clover seed	3	24	3	17
Hay a/	12	5	13	3
Improved pasture	6	5	7	4
Summerfallow	14	21	16	15
Breaking	5	5	6	4
Total, legumes	14	37	15	25
Total, coarse grains, improved pasture and hay	45	38	50	26

a/ About three-quarters is legume hay.

Almost all of the increase in cultivated land was devoted to the production of wheat and legume seed. Average wheat acreages per farm

increased from 21 acres in 1944 to 47 acres in 1950. The legume seed acreage increased from five to 34 acres per farm.

Wheat and legume seed are the only crops for which acreage has increased as a proportion of the total cultivated acreage between 1944 and 1950. Wheat increased from 23 to 32 per cent and legume seed production from five to 23 per cent of the total amount of land cultivated. Coarse grains, on the other hand, decreased from 30 to 19 per cent, and the aggregate of coarse grains, improved pasture and hay decreased from 50 to 26 per cent. The present pattern of land use reflects the accompanying decline in livestock.

The improvement of the land has emphasized the growing of wheat, as most farmers plant wheat on new land for two or three years after breaking. The growing of legume seed has been encouraged by an increasing demand for that crop. In the 15 years prior to 1950, prices for legume seed have more than doubled and output has increased about forty-fold in Alberta in that period.1/ Legumes are well adapted to grey wooded soils and farmers realize more than ever before that legumes are indispensable for the maintenance of the structure and the fertility of their soils.

It is the policy of the Government of Alberta to encourage forage crop production. For several years the Government of Alberta kept adequate reserves of seed on hand to meet the needs of farmers, and in some cases distributed the seed at less than cost. This policy was discontinued in 1949 when adequate retail outlets had been established by the seed trade. It is still the policy of the Government of Alberta to encourage forage crop production through a balanced farm project designed to encourage farmers to adopt a system in which there is a proper balance between grain and forage crops. This policy is especially suited to grey wooded soil areas.

Livestock Numbers

Changes in farm organization and practices are indicated further by changes in the numbers of various kinds of livestock. Since 1945, a considerable decrease in livestock population has taken place. As may be expected, the number of horses has decreased by about 51 per cent. There was also, however, a significant decline in all other types of livestock. The number of sheep decreased by 55 per cent while the number of hogs decreased by 35 per cent and cattle by 15 per cent. Poultry numbers decreased slightly, the average size of flock being 55 in 1950.

1/ Dominion Bureau of Statistics, Quarterly Bulletin of Agricultural Statistics.

The average number of productive animal units 1/ per farm declined from 14.1 in 1944 to 8.4 in 1950, or about 41 per cent (Table 6). Cattle represented 65 per cent of the total animal units in 1945 and 74 per cent in 1951.

Table 6.- Average Number of Productive Animal Units per Farm, 37 Farms in the Athabasca Area, Alberta, 1944 and 1950

	Animal Units		Per Cent	
	1944	1950	1944	1950
Cattle	9.1	6.2	65	74
Sheep	1.7	.7	12	8
Swine	2.6	1.0	18	12
Poultry	.7	.5	5	6
Total	14.1	8.4	100	100

Machinery and Equipment

From 1944 to 1950 a considerable increase took place in the amount of farm machinery per farm, indicating a trend toward greater mechanization. This trend was probably not a regular one, however, because of the backlog of machinery requirements which had built up during the war years.

Table 7.- Number of Farm Machines on 37 Farms, Athabasca Area, Alberta, 1944 and 1950

	Machinery and Equipment						
Year	Tractors	Combines	Swathers	Threshing Machines	Autos	Trucks	Equipment
	- number -						
1944	16.5	-	-	4	8	6.5	363
1950	44	3	1	11	4	18.5	504

1/ Farm livestock are expressed as "animal units" calculated on a basis of the feed input per kind and age of livestock. An animal unit is the equivalent of a mature cow. The standard used for converting livestock to animal units was as follows:

1 mature horse	equals 1.5 A.U.	1 calf	equals 0.3 A.U.
1 other horse	equals 1.0 " "	1 sheep (any age)	equals 0.2 " "
1 cow	equals 1.0 " "	1 sow or boar	equals 0.33" "
1 heifer or steer	equals 0.7 " "	1 other hog	equals 0.2 " "
		100 poultry	equals 1.0 " "

Horses are excluded when reference is made to "productive animal units".

The major part of the increase in farm machinery occurred in such items as tractors, trucks and threshing machines. There were about two tractors for every five farms in 1944 and six tractors for every five farms in 1950. At the same time there were close to five horses per farm in 1944 and only two in 1950. There was a truck on every second farm and a threshing machine on about every third farm. A few combines and swathers are now being used in the area.

FINANCIAL CHANGES

In this section, a study of the financial aspects of the farm business, changes will be discussed on the basis of the average for the whole group, as done in the section on farm organization. But in order that further comparisons may be made, not only between the two periods, but also between farms within a period, all 37 farms have been divided into four groups in 1944 and four groups in 1950 on the basis of size and type of enterprise. A division for size was made at the median (those above and those below) of cropland acres (70 acres in 1944 and 120 acres in 1950). A division for type of farm was made in a similar manner at the median of productive animal units (13.7 in 1944 and 7.0 in 1950).

Table 8.- Number of Farms in Each Group and Average Number of Cropland Acres and Productive Animal Units per Farm, Sample Study, Athabasca Area, 1944 and 1950

	Number of Farms		Cropland Acres		Productive Animal Units	
	1944	1950	1944	1950	1944	1950
Small farms						
Crop	12	11	54	94	8.8	3.8
Mixed	7	8	52	100	18.8	11.7
Large farms						
Crop	7	8	104	200	7.1	4.9
Mixed	11	10	145	194	21.4	13.5
All farms	37	37				

This method of grouping will permit a study in a general way of the financial aspects of small mixed farms in one period in relation to another period.1/ Similar comparisons can also be made for the other groups.

The four groups for each of the two study years are then, small and large crop farms and small and large mixed farms. The number of farms, the average cropland acres and productive animal units per farm in each group are shown in Table 8.

1/ This method of grouping has been used in Tables 11, 12, 13, 15, 17, 19, 20, 21, 22, 23 and 24.

Changes in farm prices of agricultural products as compared to changes in the prices of commodities and services used by the farmer is a major factor affecting his financial progress. During World War II the increase in farm product prices was from two to three times greater than the relative increase in the costs of items which farmers buy. From 1945 to 1951, prices of agricultural products rose approximately to the same extent as the prices of commodities and services purchased by the farmer. Thus, the farmer has been able to retain in the postwar period the favourable terms of exchange which prevailed during the war years. These changes are indicated by the price indexes in Table 9.

Table 9.- Changes in Farm Prices and Farm Costs, Western Canada, 1945 and 1950

Year	Price Index of Farm Products (Alberta) a/	Index of Farm Costs (Composite Index Western Canada) b/	Per Cent Increase from Base Period: Farm Prices Index	Per Cent Increase from Base Period: Composite Index	Per Cent Increase from 1945: Farm Prices Index	Per Cent Increase from 1945: Composite Index
1935-39	100.0	100.0				
1945	193.4	138.2	93.4	38.2		
1950	276.1	196.1			42.7	41.9

a/ Dominion Bureau of Statistics, Agricultural Division.
b/ Dominion Bureau of Statistics, Prices Branch. The Composite Index includes the Eleven Factor Index of Farm Costs, plus farm living costs.

Farm Receipts

Farm receipts and the financial progress of farmers are affected by crop yields as well as price levels. In the district around Athabasca crop yields vary considerably, the coefficient of variations 1/ being about 30 per cent. This yield variability is exemplified also by the crop yields for the two years studied. Crop yields in 1944 were slightly higher than the 30-year average. In 1950 yields were only half this average.

Table 10.- Average Farm Receipts, 37 Farms in the Athabasca Area, 1944 and 1950

Source	Dollars: 1944	Dollars: 1950	Per Cent: 1944	Per Cent: 1950
Legume seed	95	793	7	30
Wheat sales	320	453	25	17
Other crops	109	107	8	4
Livestock sales	577	815	45	31
Other farm produce	132	198	10	8
Other receipts	65	259	5	10
Total cash farm receipts	1,300	2,625	100	100

1/ The standard deviation expressed as a percentage of the mean. When the coefficient of variation is 30 per cent, two-thirds of the yields are expected to fall within a range of from 70 to 130 per cent of the average yield (the average yield for wheat in the Athabasca area is 20 bushels per acre).

Crop Sales.- Total receipts 1/ from crop sales increased from $524 per farm in 1944 to $1,353 per farm in 1950, or from 40 per cent total farm receipts to 51 per cent (Table 10). This increase in crop sales occurred in spite of very low yields for the year 1950. As a percentage of total crop sales, wheat and other crops have decreased while sales of legume seed have increased. Legume seed sales increased from seven per cent of crop sales in 1944 to 30 per cent in 1950.

Table 11.- Average Receipts from Crop Sales by Size and Type of Farm, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	369	1,212
Mixed	211	1,362
Large farms		
Crop	923	1,580
Mixed	640	1,389
All farms	524	1,353

Receipts from crop sales by size and type of farm are reported in Table 11. In general, crop sales receipts varied considerably between the small and large farms in 1944 and to a much lesser extent in 1950. The variation in crop sale receipts between the mixed and crop type farms was small in both years.

Livestock Sales.- Despite the decrease in livestock numbers, average farm receipts from livestock sales increased from $577 per farm in 1944 to $815 per farm in 1950, an increase of 41 per cent.

Table 12.-
Average Receipts from Livestock Sales According to Size and Type of Farm, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	380	627
Mixed	858	888
Large farms		
Crop	233	562
Mixed	834	1,164
All farms	577	815

1/ Includes final participation payments on grain.

Livestock sales as a percentage of total farm receipts decreased from 45 per cent in 1944 to 31 per cent in 1950, which reflects the decline in the relative importance of the livestock enterprise. A breakdown of these receipts according to size and type of farm is presented in Table 12.

Other Farm Produce Sales.- Other farm products sold are cream, eggs, potatoes, wool, hides, honey, meat and wood. Sales of these products increased from $132 per farm in 1944 to $198 per farm in 1950. Cream and eggs were the most important items of farm produce sales. Cream sales increased from 55 per cent of farm produce sales in 1944 to 78 per cent in 1950. Sale of eggs decreased from 33 to 19 per cent of all farm produce sales.

Table 13. Average Farm Produce Sales According to Size and Type of Farm, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	73	178
Mixed	179	157
Large farms		
Crop	163	107
Mixed	148	327
All farms	132	198

Other Farm Receipts.- Other sources of farm receipts include such items as custom work, equipment sales and outside farm labour. The magnitude of these receipts is illustrated in Table 14. Equipment sales is the main item of other farm receipts that has increased from 1944 to 1950. This increase is related to a turnover in equipment associated with the build-up of more modern machinery.

Table 14.- Average Other Farm Receipts, 37 Farms in the Athabasca Area, 1944 and 1950

All farms	1944	1950
	- dollars -	
Custom work	35	30
Outside farm labour	4	49
Equipment sales	3	146
Other	23	35
Total other farm receipts	65	260

Total Cash Farm Receipts.- Total cash farm receipts increased from $1,300 per farm in 1944 to $2,625 in 1950. The greater portion of this increase was due to increased legume seed sales (Table 10).

Total cash farm receipts per farm were greater on the mixed farms than on the crop type of farm in both years (Table 15). On a cropland acre basis, cash receipts in 1944 amounted to $14.63 on the crop farms and $14.30 on the mixed farms (Table 16). In 1950 cash farm receipts were $16.92 per acre on the crop farms and $19.17 on the mixed farms.

Table 15.- Average Total Cash Farm Receipts by Type and Size of Farm, 37 Farms in the Athabaska Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	857	2,229
Mixed	1,304	2,548
Large farms		
Crop	1,393	2,500
Mixed	1,722	3,222
All farms	1,300	2,625

Table 16.- Average Total Cash Farm Receipts per Cropland Acre by Type and Size of Farm, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars per cropland acre -	
Small farms		
Crop	15.96	23.81
Mixed	25.08	25.38
Large farms		
Crop	13.43	12.50
Mixed	11.84	16.59
All farms	14.44	18.10

Farm Expenses

The average cash operating expenses increased from $454 per farm in 1944 to $1,030 per farm in 1950. These expenses are itemized and the changes shown in Table 17.

Absolute increases occurred in all major categories of farm expenses with the exception of custom work. The decrease in expenses for custom work again reflects a more adequate supply of farm machinery.

Table 17.- Average Cash Operating Farm Expenses, 37 Farms in the Athabasca Area, 1944 and 1950

	Per Farm			
	1944	1950	1944	1950
	- dollars -		- per cent -	
Seed purchase and crop expense	49	118	11	12
Machinery operations	130	399	29	39
Livestock feed and expense	43	60	9	6
Taxes and real estate upkeep	52	149	11	14
Custom work	135	105	30	10
Paid labour	9	96	2	9
Car and truck (farm share)	36	103	8	10
Total	454	1,030	100	100

Seed Purchase and Crop Expense.- This group includes expenses for seed treatment and cleaning, binder twine, hail insurance, weed sprays, fertilizer and seed purchases. Binder twine and seed purchases are the main items in this group, averaging $15 for binder twine and $18 for seed per farm in 1944 and $43 and $65 respectively in 1950.

Machinery Operations.- Equipment expenses as a percentage of total cash operating expenses increased from 29 per cent in 1944 to 39 per cent in 1950. Fuel, oil, grease and equipment repairs were the main items in this group. Fuel, oil and grease expenses per cropland acre amounted to $0.61 in 1944 and $1.49 in 1950. Expenditures on equipment repairs were $0.56 per cropland acre in 1944 and $0.95 per cropland acre in 1950.

Livestock Feed and Expense.- Expenditures on livestock as a proportion of total cash operating expenses have decreased from nine to six per cent. These expenditures include pasturing stock, rent of pasture, hay lease, breeding fees, feed purchased, veterinary fees, medicines, salt, stock food and sheep shearing. Feed purchases constitute the main item in this category of expenditures.

Taxes and Real Estate Upkeep.- Real estate taxes increased from $40 per farm in 1944 to $72 per farm in 1950, or from $0.44 to $0.50 per cropland acre. Real estate taxes decreased from nine to seven per cent of total cash operating expenses from 1944 to 1950. Paint and repairs to buildings and repairs to wells and fences increased from two to seven per cent of total cash operating expenses, or from $11 to $68 per farm, between 1944 and 1950.

Other Farm Operating Expenses.- "Other farm operating expenses" include the farm share of car and truck expenses, labour expense, custom work, and board of crew and paid labour. Labour expenses increased from two to nine per cent of total cash operating costs from 1944 to 1950. Expenditures for custom work, which were high in 1944, decreased from 30 per cent to ten per cent of total cash expenses, or from $1.50 per

cropland acre in 1944 to $0.72 per cropland acre in 1950.

Total cash operating expenses per cropland acre increased from $5.04 in 1944 to $7.09 in 1950. These are given by size and type of farm in Table 18.

Table 18.- Average Cash Operating Expenses per Cropland Acre, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	5.07	9.19
Mixed	7.33	8.64
Large farms		
Crop	4.12	5.80
Mixed	4.91	6.37
All farms	5.04	7.09

Other Main Expenditures.- Apart from current farm operating costs, other main cash outlays were for: payments on debt, capital expenditures, and family cash living expenses.

Table 19.- Average Expenditures for Debt Payment, Capital Goods, and Family Cash Living, 37 Farms in the Athabasca Area, 1944 and 1950

Type of Expenditure	1944	1950
	- dollars -	
Debt payment	56	213
Capital expenditure	447	1,522
Family cash living	606	1,246
Total	1,109	2,981

Payments on debt and capital expenditures increased almost four times from 1944 to 1950, and cash living costs doubled in the same period (Table 19). As a proportion of the total, debt payments and capital outlays increased while family cash living expenses declined from 55 per cent of the total to 42 per cent. The total spent on all three of these itmes increased from $1,109 per farm in 1944 to $2,981 per farm in 1950 (Table 20).

Table 20.- Average Debt Payments, Capital and Family Cash Living Expenditures, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	951	2,232
Mixed	1,198	2,805
Large farms		
Crop	829	2,788
Mixed	1,406	4,105
All farms	1,109	2,981

Returns and Changes in Net Worth

Four measures of income were used to appraise the success of the farm business for a particular year. These measures indicate the actual return after making the necessary allowances for costs and receipts.

Return to Capital and Operator's Labour.- Return to capital and operator's labour is the amount that remains after all costs, except investment costs and the value of operator's labour, have been subtracted from gross returns. This return is the amount that is earned by the operator through his labour and by capital for its use in the farm business.

The return to capital and operator's labour for all farms was 52 per cent greater in 1950 than in 1944. In 1944 the mixed type of farm had larger returns to capital and operator's labour than the crop type. In 1950 the differences in return to capital and operator's labour between types and sizes was much greater. The effects of very poor yields are clearly shown. The larger farms had lower returns than the smaller farms and the mixed type of farm realized greater returns than the crop type.

Table 21.- Average Return to Capital and Operator's Labour, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	470	784
Mixed	728	1,519
Large farms		
Crop	650	228
Mixed	740	1,310
All farms	633	965

Labour Income.- If capital or investment costs are subtracted from return to capital and operator's labour, the residual income represents the return to the operator for his labour and management. This measure is termed "labour income" and is a useful measure for comparing the success of farms from one area to another since it takes into account both cash and non-cash items of cost. In this study a rate of interest of five per cent is deducted as the cost of capital invested.

When investment costs are deducted from returns to capital and operator's labour the average returns per farm are smaller in 1950 than in 1944. This is due to the much larger amounts of farm capital invested in 1950 and the low crop yields in that year. These returns were not sufficient to cover the cash living expenses. This does not mean that the farmer went into debt to pay for his living expenses. He may have drawn on a surplus accumulated during previous years. Or, he may have deferred his capital replacement until he had a surplus. Unpaid labour is also a non-cash expense which does not have to be met at any particular time.

Table 22.- Average Labour Income by Type and Size of Farm, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	305	422
Mixed	525	1,011
Large farms		
Crop	393	-600
Mixed	321	490
All farms	368	347

Labour Earnings.- When the value of farm products used and the use of the house 1/ is added to labour income the resulting income is called "labour earnings". This measure is an appropriate one to use for comparing the average income of farm operators and urban wage earners.

Although it is not very practical to compare real income on the farm with real income for the urban workers, because of many non-measurable items, a rough comparison on the basis of money income may have some value. The average weekly wage for urban workers in Alberta was $33.05 in 1944 and $45.61 in 1950.2/ On an annual basis this amounted to $1,719 in 1944 and $2,372 in 1950. These are considerably higher than the labour earnings for the farm operator in the Athabasca area. The average labour earnings per farm operator amounted to $672

1/ The charge for use of the house was 12 per cent of its present value.
2/ Dominion Bureau of Statistics, Canadian Statistical Review, Ottawa. February 1951.

in 1944 and $838 in 1950. The adverse effects of low crop yields and the greater variability of income on a crop type farm are illustrated in Table 23.

Table 23.- Average Operator's Labour Earnings, by Size and Type of Farm, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	584	827
Mixed	888	1,498
Large farms		
Crop	608	-135
Mixed	671	1,101
All farms	672	838

Farm Surplus.- To assess the farm business from the standpoint of its capacity to pay off debts and provide for savings the "farm surplus" measure of income is used. Gross cash returns plus net inventory changes, minus cash operating expenses and family living expenses equal farm surplus.

Table 24.-
Average Farm Surplus and Non-Farm Income According to Size and Type of Farm, 37 Farms in the Athabasca Area, 1944 and 1950

	Farm Surplus		Farm Surplus plus Non-Farm Income	
	1944	1950	1944	1950
	- dollars -			
Small farms				
Crop	50	-60	153	215
Mixed	322	362	358	584
Large farms				
Crop	231	-1,042	370	-346
Mixed	157	210	275	823
All farms	167	-109	268	337

There was an average farm surplus of $167 in 1944 and -$109 in 1950. The farm surplus was above zero for all farms in 1944. In 1950, the farm surplus was negative for the small and the large crop farms but positive for the small and large mixed farms. The effect of size and

the combination of enterprises is again clearly noticeable in a year when yields are below the long term average.

Apart from low yields, the negative farm surplus for 1950 may also have been influenced by the relatively higher level of living expenses in that year. The index of farm living costs rose 45 per cent during the six-year period under study, whereas cash living expenses in 1950 were more than double the level in 1944. 1/ This reflects the influence of living expenses which do not follow closely receipts in any one year.

If non-farm income is added to farm surplus the debt paying capacity and the ability of the farm operator to provide for savings is increased significantly. This is well illustrated by the data provided in Table 24.

Average Progress of Farmers.- The measures of returns discussed so far all relate to the returns for the year studied. As a better measure of the long-run productivity of a farm and the average progress made by the farmer over a period of time, the average yearly change in the net worth may be used.

The average net worth for all farms in the Athabasca area increased from $5,803 in 1944 to $13,281 in 1950. The average yearly change in net worth was $1,246. Average net worth figures in relation to size and type of farm for the 37 farms included in the study are given in Table 25.

Table 25.- Average Net Worth, by Size and Type of Farm, 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- dollars -	
Small farms		
Crop	3,623	7,621
Mixed	4,694	11,297
Large farms		
Crop	5,793	17,857
Mixed	8,842	17,432
All farms	5,803	13,281
Average yearly change		1,246

So that further comparisons may be made of the progress made by farmers, the farms studied in the year 1950 were grouped differently in Table 26 than in previous tables. In Table 26, farmers were grouped on the basis of their size and type in 1944. For example, the 12 farms

1/ Dominion Bureau of Statistics, Price Index Numbers of Commodities and Services Used by Farmers.

in the "small crop" group had an average net worth of $3,623 in 1944. The average net worth figure in 1950 for these same 12 farmers is $10,004, giving them an average increase of $1,064 per year.

The small farms showed the greatest percentage increase in the net worth during the six-year period (Table 26). It was on these farms that the greatest part of the land improvement program took place. The mixed farms showed the greatest absolute gain in net worth.

Table 26.- Average Net Worth by Size and Type of Farm in 1944, a/
37 Farms in the Athabasca Area

	1944	1950	Increase	Yearly Change	Per Cent Increase
	- dollars -				- per cent -
Small farms					
Crop	3,623	10,004	6,381	1,064	176
Mixed	4,694	13,527	8,833	1,472	188
Large farms					
Crop	5,793	12,844	7,051	1,175	122
Mixed	8,842	16,976	8,134	1,356	92

a/ The 1950 net worth figures apply to size and type of farm as grouped in 1944.

Crop yields during the period under study were slightly below normal. The average yields of wheat, oats, and barley for the period from 1944 to 1950 inclusive in Census Division 14 were 19, 31 and 21 bushels respectively, as compared to the 30-year average of 21, 34 and 23 bushels.

The progress made by the farmer is due partly to improvements and expansions and partly to higher valuations. In order to measure that part of the progress which was due to improvements and additions to the farm business, the value of each component of the net worth figure for 1951 was converted to a 1945 valuation by an appropriate index (Table 27).

A comparison of actual and adjusted values indicates a 50 per cent increase in land and land improvements, a slight increase in farm buildings, an increase of more than 100 per cent in farm machinery and a 50 per cent increase in other assets. There was a decrease in livestock, feed and seed inventories. The net result was an increase of $2,213 for the six-year period, or an average annual increase of $369.

Table 27.- Average Net Worth, 37 Farms in the Athabasca Area, 1945 and 1951, and 1951 Net Worth Indexed to 1945 Prices

	April 1945	April 1951	April 1951 Indexed to 1945 Prices a/
		- dollars -	
Land	2,085	4,640	3,093
Buildings	836	1,769	946
Farm machinery	1,298	4,424	2,712
Livestock	905	1,686	866
Feed and supplies	208	189	104
Seed	124	187	98
Other assets	532	1,267	765
Total assets	5,988	14,162	8,584
Total liabilities	185	881	568
Net worth	5,803	13,281	8,016
Change in net worth		7,478	2,213
Yearly change		1,246	369

a/ All indexes used, with the exception of the land index, are from the Dominion Bureau of Statistics, Prices Branch, Prices and Price Indexes. The land index is an office calculation and applicable only to the Athabasca area.

AN ECONOMIC ANALYSIS OF THE FARM BUSINESS

The requirements of factors of production, such as labour, land and farm capital, is an important consideration in a successful farm business. The degree of control over the amounts and rates of use of these resources will determine to quite an extent the degree of financial success in a farm business. In theory, the optimum quantities of labour, capital and other resources employed by the firm will be those which maximize total net revenue, or, net revenue is maximized when the resources available to the firm are allocated in a manner such that the marginal physical productivities of the factors employed are in proportion to their prices. There are many limitations in the practical world however, which prevent the farm firm from operating at these optimum levels at any one point of time.

Labour Requirements

Labour requirements involved in the operation of a normal farm are of three classes: operator's labour, hired labour and family labour.

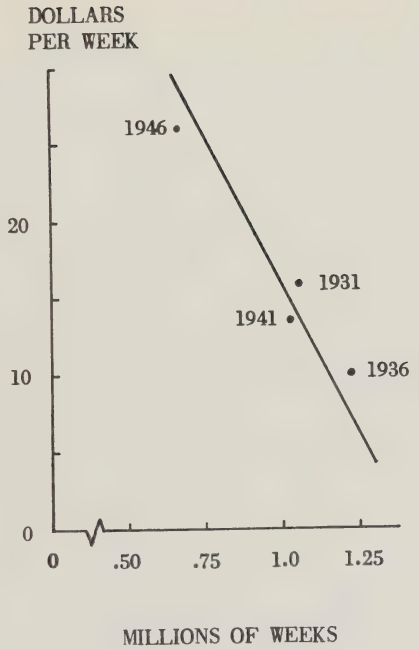

Fig. 1. - Weeks of hired labour used on farms and price (including room and board) paid, Alberta, selected years.

Source:- Census of Canada.

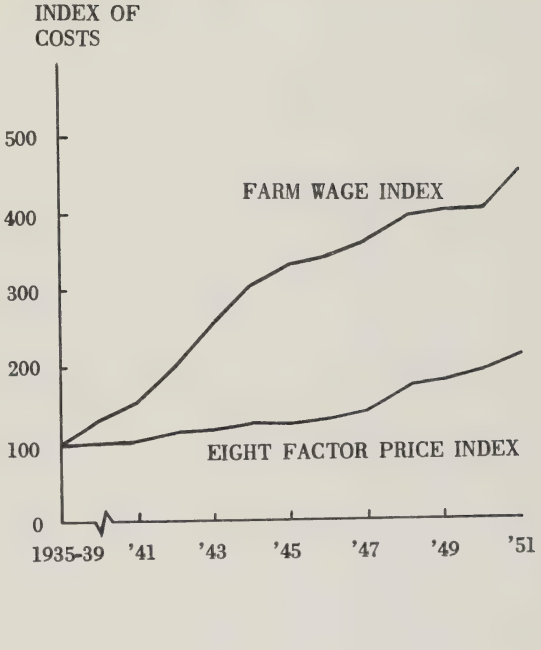

Fig. 2. - Relationship between farm wage index and price index of commodities and materials used by the farmer, Western Canada.

Source:- Labour and Prices Division, Ottawa, Canada

It is from one or more of these that the operator obtains his total supply of labour required to operate his farm.

The average total labour requirements per farm for the 37 farms studied in the Athabasca area was over 200 "productive man work units".1/ Labour requirements for these farms increased from 210 productive man work units in 1944 to 227 productive man work units in 1950 (Table 28).

Table 28.- Relationship Between Cropland Acres, Productive Man Work Units and Productive Animal Units; Average per Farm 37 Farms in the Athabasca Area, 1944 and 1950

	1944	1950
	- number -	
Cropland acres	90	145
Productive man work units	210	227
Productive animal units	14.1	8.4

The use of hired labour increased by half a month per farm during the six-year period from 1944 to 1950.

Of the three classes of labour normally used on a farm the supply of unpaid labour (operator and family) is of a more fixed nature than the supply of hired labour. When there is relatively little hired labour available the supply of labour becomes inelastic and costly and its effectiveness becomes more important to a successful farm business.

In the last ten to 15 years the use of hired farm labour has decreased and its price increased considerably (Figure 1).2/ From 1936 to 1946 the amount (weeks) of hired labour used on farms in Alberta decreased by 46 per cent. The amount of hired labour used on farms in Census Division 14, in which the study area is located, decreased by 41 per cent. At the same time, the average weekly wage, including room and board, in Alberta, increased from $10 in 1936 to $26 in 1946. This increase in farm wages is illustrated also in Figure 2 in relation to

1/ A "productive man work unit" is a measure of the amount of work to be done on the farm. It represents the average amount of directly productive work accomplished by one man, under average conditions, in a ten-hour day. By directly productive work is meant work which increases output in the same year the labour was expended. It does not include work which is productive only in the longer run, such as clearing and breaking land. The number of productive man work units on a farm is calculated by multiplying the number of acres in each crop and the number of each kind of livestock by units which have been established on the basis of the average amount of time required to handle one acre or one animal. Table 23 on page 118 of Farm Business Management by H.R. Hare, the Ryerson Press, Toronto, was used as a basis for calculating productive man work units in this study.

2/ Census of Canada.

the increase in prices of other commodities and services used by the farmers.1/

When hired labour is scare, labour is limited in the extent to which it is a flexible factor in farm planning. This emphasizes the importance of getting the right amounts of capital associated with labour and management. When labour is in relatively short supply the use of capital should be greater. Some forms of capital will be released while other forms of capital will be increased. Enterprises with large labour requirements, such as dairying, will become less profitable, and these enterprises will be decreased in size or dropped altogether. At the same time those forms of capital which will efficiently replace labour should be added. An increase in the use of more and better farm equipment is one of the most efficient methods of substituting capital for labour when labour is relatively costly.

Labour Efficiency

Labour efficiency is the ratio between the amount of labour available and the farm output, or, the amount of labour input as compared to farm output. Labour is considered efficient if farm output is relatively high as compared with the labour input or the amount of labour available. Because labour is usually the most costly factor in farm production, labour efficiency is important from the standpoint of maximizing net returns and providing adequate income for family living.

Rating Labour Efficiency.- As a measure of labour efficiency the productive man work units per man equivalent is used.2/ To rate the effectiveness of labour, labour used on each individual farm is compared with the average for all farms. The average productive man work units per man for all 37 farms in the Athabasca area was 201 per farm in 1944 and 191 per farm in 1950. Productive man work units per man ranged from 39 to 391 for the 37 farms in 1944 and from 64 to 457 in 1950. The average productive man work units per man for 1944 and for 1950 indicate that there has been little change in labour efficiency between the two periods. The wide range in productive man work units per man indicates that some farmers operate below and quite some distance from the average. These farmers are not making the most productive use of available labour.

The effectiveness of labour can also be rated by dividing farms into groups on the basis of labour efficiency. The groups with the higher labour efficiency should show an increase in output as compared to groups with a lower labour efficiency. The 37 farms in the Athabasca

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1/ The other commodities and services included in the eight-factor price index are: farm machinery, building materials, gas, oil and grease, feed, fertilizer, binder twine, seed and hardware.

2/ A man equivalent represents one man on a farm for one year. If the total number of productive man work units on the farm is divided by the number of man equivalents, the result is work units per man as a measure of labour efficiency.

area were divided into three groups for each of the two study years. Using labour income as a measure of farm output, the relationship of labour input and farm output is illustrated in Table 29.

Table 29.- Relationship Between Productive Man Work Units per Man and Labour Income, 37 Farms in the Athabasca Area, 1944 and 1950

Group	Group Classes: Productive Man Work Units per Man	1944: No. of Farms per Group	1944: Average Productive Man Work Units per Man	1944: Labour Income	1950: No. of Farms per Group	1950: Average Productive Man Work Units per Man	1950: Labour Income
		- number -		- dollars -	- number -		- dollars -
1	0 - 150	10	91	44	14	114	435
2	151 - 220	13	187	407	12	185	479
3	221 and over	14	293	564	11	296	90

Table 29 shows that as the efficiency of labour increased, labour income also increased for all groups, with the exception of group 3 in 1950. These increases shown in labour income, however, may not be due primarily to increases in labour efficiency. The increases in labour income may have been affected to some extent by other factors, such as the size of business, yield and combination of enterprises. If, however, other factors affecting labour income are held constant and labour income still increases with increased labour efficiency, it can then be inferred that the variations in labour income are due to differences in labour efficiency.

To eliminate the effect that these other major factors may have on labour income, the farms were divided into two groups for each study year: (1) those in which productive man work units per man equivalent were below the group average (201 P.M.W.U. per man in 1944 and 191 P.M.W.U. per man in 1950) and (2) those in which they were above the average. The records from group 1 were then paired with records from group 2, for 1944 and 1950, which were similar in number of productive animal units per farm. This has the effect of comparing only those farms which are similar in their organization of the farm enterprises. Labour income was calculated on a per-acre basis in order to hold size more or less constant. The land use pattern is similar for all farms in the survey and crop yields vary only slightly between farms in the area studied. Table 30 shows that an increase in labour efficiency in 1944 was associated with an increase in labour income of 40 cents per cultivated acre. An increase in labour efficiency in 1950 was associated with an increase in labour income of $1.04 per cultivated acre.1/

1/ The increase in labour income cannot be attributed wholly to increased labour efficiency. Dividing labour income by cultivated acres does not eliminate entirely the effect of size. Since there are differences in the average size of farm of the groups for which comparisons were made, increases in labour income may be due therefore both to the effect of size and the effect of increased labour efficiency.

Table 30.- Relationship Between Labour Efficiency and Labour Income, Athabasca Area, 1944 and 1950

	Unit	1944		1950	
		Group 1	Group 2	Group 1	Group 2
Number of farms	number	11	11	11	11
Productive animal units	number	15.1	15.1	8.1	8.0
Cultivated acres	number	73	95	121	161
Productive man work units per man	number	161	264	131	238
Labour income per cultivated acre	dollars	4.58	4.98	3.06	4.10
Difference in labour income	dollars		.40		1.04

Increasing Labour Efficiency.- To increase labour efficiency or the productivity of farm workers, farmers would have to increase either the number of hours of work per year or the output per hour of labour. With regard to working longer hours, there are farmers who do not wish to maximize their net earnings by increasing the use of the labour available to them. This appeared to be the case for those farmers who were putting in comparatively few hours of directly productive work during the year. Perhaps the small change in the average number of productive man work units per man equivalent from 1944 to 1950 indicates that the farmer in the Athabasca area has no great desire to put in more than 200 days of directly productive work per year. This figure of 200 days per year may increase, however, as the amount of directly unproductive work decreases. In the initial settlement stages there is a great deal of directly unproductive work, such as putting up buildings and clearing and breaking land. Farmers in the Athabasca area have been and still are in the process of developing their farms.

The second method of increasing labour efficiency, by increasing output per unit of labour input, can be accomplished in several ways. The product per hour of labour can be increased by a better farm organization. This entails emphasizing the most profitable enterprises of the production plan. Enterprises can also be combined so as to spread the demand for labour over the entire year. For example, livestock enterprises may be used to create a demand for labour during those periods of the year when there is little work to be done on crops. Also, the more unproductive and flexible jobs such as fencing and clearing land can be done when there is no other work to do.

The productivity of labour will also increase with technical improvements. An increase in the knowledge of farming and improvements in the actual methods of farming will increase labour efficiency and net returns. Technical progress involves not only the knowledge of new methods but also their application. Knowledge of the existence of a new kind of alfalfa seed or of a more efficient method of clearing land is not enough. The new methods must be used if they are to benefit the farmers. The application of these methods, however, will in most

cases necessitate the accumulation of capital; that is, a new kind of seed or piece of equipment cannot be acquired and used until funds have been saved for its purchase. Technical progress, therefore, will be limited to quite an extent by the conditions which limit the rate of capital accumulation.

Capital Requirements

The amount of capital required by the farm operator of the agricultural industry will be in relation to the productivity of capital. Capital, in spite of the forces which limit its mobility, should be added in an amount consistent with changes in its marginal value productivity.1/ That is, if net returns can be increased by a relatively greater use of capital then capital in its most productive form should be added.

The capital requirements of a successful farm business are relatively large today as compared to even ten or 15 years ago. Farm capital is required in the form of land, buildings, equipment, livestock, feed and seed and other supplies. Funds held in the form of securities and cash balances may also be considered as farm capital. The extent of these capital requirements varies with several factors but mainly with type of farm.

Varying capital requirements for different types of farming in the Athabasca area are illustrated in Table 31 where comparisons of average farm capital investments are made between crop type farms and those farms on which a more mixed type of enterprise is carried on. Of the 37 farms studied in the Athabasca area, farms of the mixed type had an average per farm capital investment about 22 per cent greater than the average capital investment on crop type farms. The average capital investment per cultivated acre was greater by 11 per cent on the mixed type of farm as compared with the crop farms. The proportion of total capital invested in land and equipment was greater on the crop farms than on the mixed type farms, while the proportion invested in livestock and buildings was greater on the mixed farms than on the crop type farms.

1/ "In an industry such as agriculture where the aggregate price elasticity of demand for farm products is 'apparently' less than 1.0, the long-run opportunities for addition of capital are indeed limited. While technical change is one important avenue whereby value productivity of resources is increased and hence a greater stock can be employed, the opportunities for agriculture to absorb a total of more resources through this means is also limited . . . . technical improvement must generally tend in the direction of fewer rather than more total resources in an industry of inelastic demands. However, the value productivity of a specific resource such as capital may be increased encouraging a greater use . . ." Heady, Earl O., "Capital Formation in Agriculture," Economic Efficiency Series, Paper No. 10, Research Seminar, University of Chicago, 1950.

Table 31.- Average Capital Investments on Crop and Mixed Farms, 37 Farms in the Athabasca Area, 1950

	Capital Investment per Farm				Capital Investment per Cultivated Acre	
	Crop		Mixed		Crop	Mixed
	Dollars	Per Cent	Dollars	Per Cent	Dollars	Per Cent
Land	4,660	42	4,475	33	33.65	29.34
Buildings	1,443	13	2,028	15	10.42	13.30
Equipment	3,825	34	4,391	32	27.62	28.79
Livestock	856	8	2,283	17	6.18	14.97
Seed, feed and supplies	389	3	439	3	2.81	2.88
Total farm capital	11,173	100	13,616	100	80.68	89.28

Acquiring capital in sufficient amounts to make the farm business successful is usually a slow process and must generally be repeated during the life span of each farm firm.1/ Capital accumulation is a slow process in agriculture due to the fact that the major portion of capital outlay must come from savings earned within the industry. The extent to which savings can be made by the industry will depend on its level of production.2/ In areas where the level of production is low the insistent demand for the necessities of consumption press continually against small outputs and makes any accumulation difficult.

In developed farm areas, insufficient amounts of capital owned by the farm operator can often be supplemented by rented capital such as land. In settlement areas, however, land - the form of capital usually rented - is still in the undeveloped stage and therefore of little immediate value to the farm business. Capital owned by the operator can also be supplemented by borrowed capital. Capital acquired by borrowing is limited, however, because the farm firm has only a relatively small credit base due to the attendent risk of the instability of farm earnings. In settlement areas credit is limited not only by the instability of earnings but also by their meagreness arising out of a low level of production per farm.

1/ Capital accumulation is one of the ultimate goals of people, especially farm families. Farm families have no formal retirement plans; instead, they have an added incentive to accumulate capital as a security for old age.

2/ The rate of savings or capital accumulation depends also on the individual farm operator and his family. At given levels of income the rate of capital accumulation will vary between individuals because of differences in their propensities to consume, and varies for the individual over time for the same reason. Some farm families will be content with a small rate of consumption while their capital builds up; others will consume their entire production and not make any provision for savings.

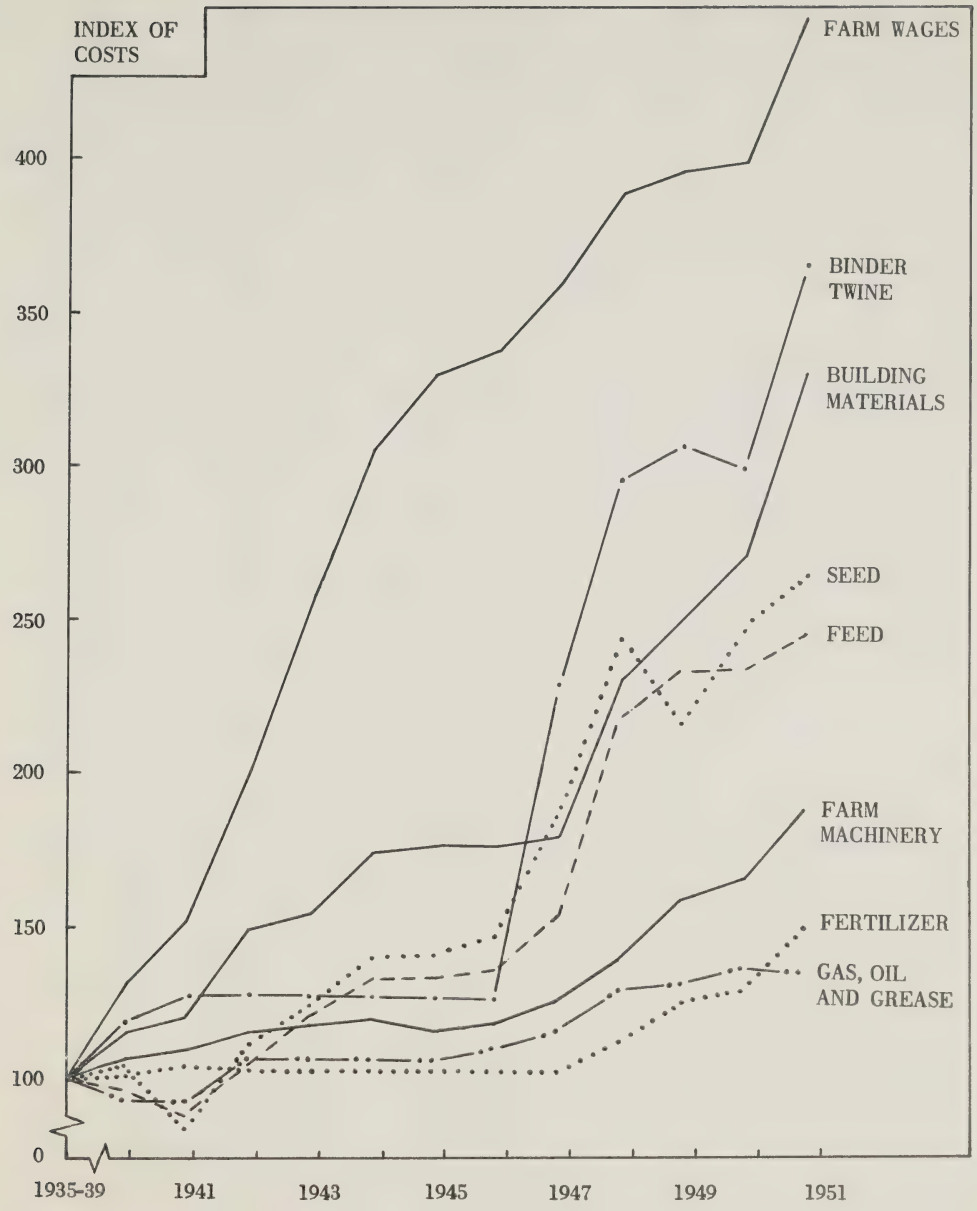

Figure 3.- Index numbers of farm costs (Western Canada), April of 1940 to 1951.

Source: - Price Index Numbers of Commodities and Services Used by Farmers. Labour and Prices Division, Dominion Bureau of Statistics, Ottawa, Canada.

Because capital requirements are relatively large there is a tendency for many farm operators to have insufficient amounts of farm capital, and due to its lack an ill-balance of capital investment frequently develops. Too great a proportion of the funds available may be invested in one or more capital forms leaving a deficient amount for other uses. As a consequence, net returns from total investment are less than might otherwise be secured. A shortage of capital investment is the general situation in the early stages of development of the farm firm, and especially in the early stages of development of farms in newly settled areas. The initial settlement stage requires also that capital be invested first in its least productive form, such as buildings.

The relative profitableness of the use of different forms of capital, such as fertilizer, machinery and building materials, or of capital and labour will depend on the cost of these resources. Thus an increase in the cost of one form of capital in relation to others will make it more profitable for the farm operator to increase the use of the latter. Similarly, an increase in the cost of labour as compared to the costs of capital will lead to a diminution in the amount of labour employed. Figure 3 indicates that the cost of some forms of farm capital has not increased to nearly the same extent as that of labour. The index of farm machinery prices and the index of gas, oil and grease prices for Western Canada increased from 100 in the base period to 197 and 138 respectively in April 1952. The eight-factor index of materials used by the farmer increased from 100 to 216 in the same period (Figure 2). At the same time the wage rates index increased from 100 to 335 in April 1946, and to 485 in April 1952. These changes in the prices of farm resources have encouraged a diminution in the employment of labour and an increase in the use of capital.

These price changes would thus explain to quite an extent the more than 100 per cent increase in the physical volume of farm machinery (Table 27) associated with a 60 per cent increase in cultivated acres on 37 farms in the Athabasca area.1/ Average capital investments in farm machinery are shown in Table 32 on a per cultivated acre basis.

Table 32.- Average Capital Investment in Farm Machinery per Cultivated Acre, 37 Farms in the Athabacas Area, 1944 and 1950

	1944	1950	1950 Values Indexed to 1944
		- dollars -	
Small farms	15.43	30.28	18.57
Large farms	14.36	27.16	16.65
All farms	14.69	28.22	17.30

1/ The 1950 machinery investment, however, includes a relatively larger quantity of farm power than the investment for 1944. This is because of a decrease in the number of horses per farm between the two years and an increase in tractor power.

When the 1950 farm machinery values are indexed to a 1944 base a physical increase in volume of almost 20 per cent is indicated. The large farms were found to have a smaller investment in farm machinery per cultivated acre than the small farms.

Scale of Operations

The size of farm or scale of operations is an important consideration in a successful farm business. If the farm enterprise is not on a sufficient scale the level of production will be low and earnings will be inadequate for savings and family living. Smaller sized farms may also be at a disadvantage if they cannot distribute resources as efficiently as larger farms. Too small a proportion of their total resources may be invested in the most productive units of the farm, such as cultivated land and livestock, and too large a proportion in buildings and equipment.

Although the size of farm is an important consideration in a successful farm business, there are still many farms operating at a scale less than the optimum. This is particularly true in relatively newly settled areas where farms are still at a stage short of full development. The one method where farm operators probably have the greatest opportunity of increasing net earnings is by increasing the size of farm or the scale of operations. For many farmers, such as those in the Athabasca area, this involves mainly the acquisition of more land as a full line of equipment is already available to service larger acreages.

Figure 4 is a graphic illustration of the relation between farm costs per cultivated acre, excluding unpaid labour and interest on capital, and cultivated acres per farm for the 37 farms included in the study. The line fitted to the data indicates lower farm costs per cultivated acre as the size of farm increases. It is also noted that all farms in the study are being operated within the range of decreasing costs. An increase in the size of these farms would result in lower costs per acre and increased net earnings. This is particularly true of the farms which operate quite some distance short of the optimum size.

Since most of the farms in the Athabasca area are still in the stage of development, they are subject to all the difficulties of capital accumulation and of development into economic units that prevail in pioneering regions. Farms in the area may also be restricted further by the policy under which settlement takes place. The maximum amount of land available to homestead lessees is 320 acres. If 50 per cent of this is non-arable there will come a time in the stage of development when land will not be available to turn the farm into an economic unit. The area being settled will then have to go through the slow process of consolidation of ownership.

Land Use and Choice of Farm Enterprises

The size of farm and the distribution of resources contribute to the success of a farm business, but their importance is no greater than that of the choice of a land use pattern which will permit the production of farm products that have a comparative advantage in the area.

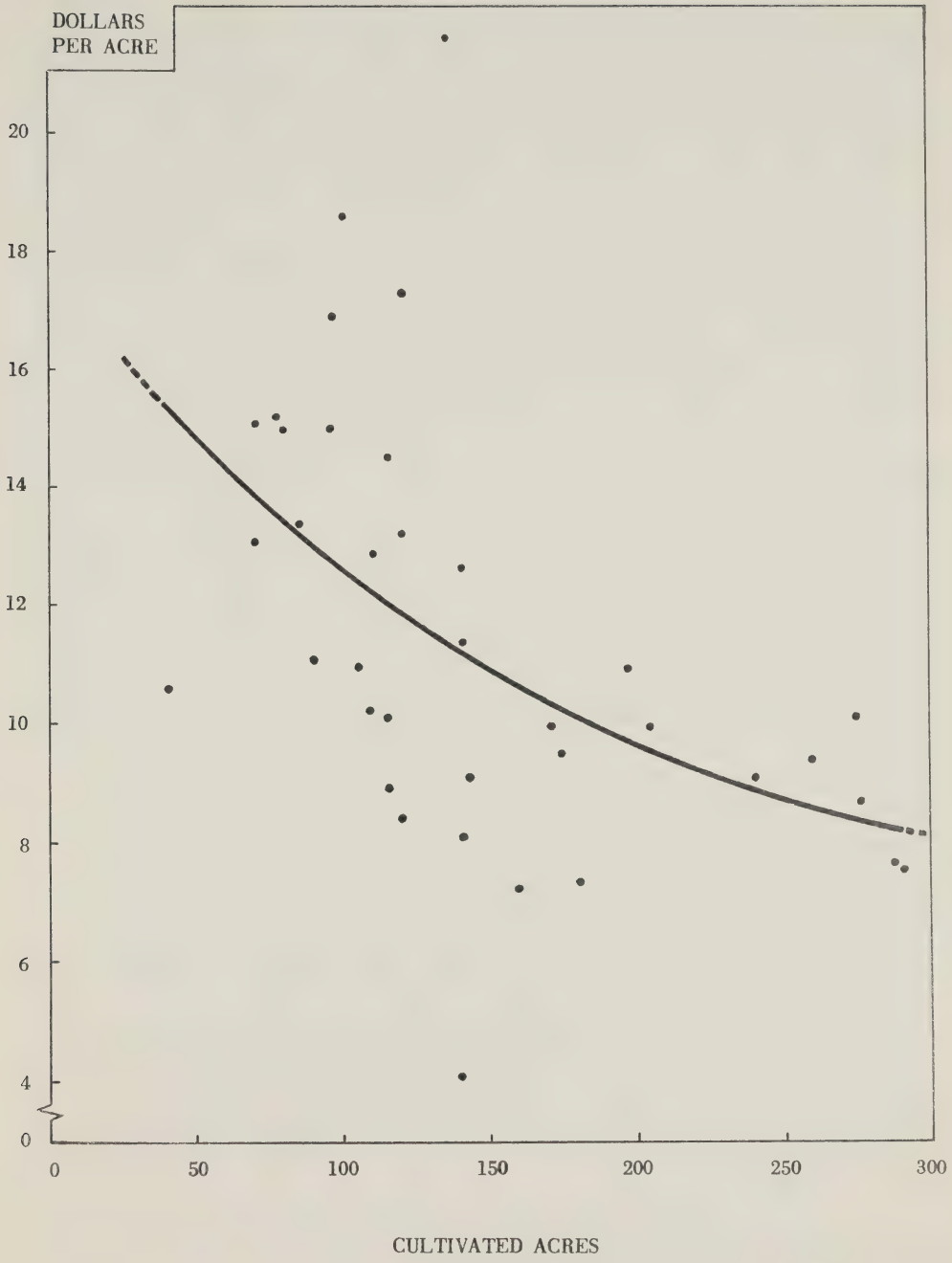

Figure 4. - Farm costs per cultivated acre for 37 farms in the Athabasca area, Alberta, 1950.

In the Athabasca area the predominant type of farming is the grain-legume seed combination. Wheat is the most important of the grain crops. A relatively large amount of new land has been broken and wheat is generally grown on these lands. Legumes are also an important crop and are considered indispensable to the management of grey wooded soils. The production of legume seed has been a profitable enterprise in the Athabasca area and many other parts of northern Alberta.

The Livestock Enterprise.- The decrease in livestock noted in the Athabasca area may be due partly to the sharp decrease in farm income which has occurred in this area in the three years from 1948 to 1950 inclusive.1/ A decrease in the flow of income for a period of two or three years may result in farm resources being depleted for consumption purposes. Capital in the form of livestock is then the first to go as this form of capital is easily transferred to other forms of capital or income. This depletion of capital will be at a faster rate if, prior to the years of poor crop yields, expansion in the farm business has been extended to the limits of existing credit facilities.

Of more importance in explaining the decrease in livestock numbers in the Athabasca area is the short labour supply situation experienced by farmers in recent years. As livestock production requires relatively large quantities of labour, the scarcity and high cost of this factor in relation to other factors of production has made livestock production less profitable as compared to other farm enterprises. Nor is the livestock enterprise complementary to the production of wheat and legume seed. Wheat and legume seed are cash crops and their production does not produce feed of any significant value to livestock. Both wheat and legume seed compete with feed crops for the use of the land.

Raising cattle on a profitable basis is limited also by the scarcity of natural pasture lands which have no other use. When cattle production is dependent significantly on the availability of natural pasture, as it generally is in the Prairie Provinces, cattle will be relegated to a minor farm enterprise on commercial farms in woodland areas, such as the Athabasca area, where natural pasture is scarce. The alternative to natural pasture would be the production of legumes for hay and pasture. This change will not take place, however, as long as the production of legume seed is as remunerative as it has been in the past. The trend has been away from cattle and feed production and towards an increase in the production of legume seed. The long and severe winters prohibit a change in the present trend of farm organization and land use. The high cost of producing feed for cattle for both summer and winter months and the relative high cost of labour probably make cattle production one of the least profitable enterprises in the Athabasca and other northern areas.

1/ Grain yields in Census Division 14, in which the study area is located, were about 85 per cent of the 30-year average in 1948, 70 per cent in 1949 and 50 per cent of the long-time average in 1950.

Level of Living

An important objective of farm business studies is to determine if there is adequate income for a reasonable level of living and for farm savings. It would appear from the preceding sections that farm operators have been able to provide savings for considerable farm expansion . Has there been a change in the level of living during the period studied?

In the last ten years, 13 of the 37 farm operators interviewed had built new homes. The number of families with a car or truck increased from 14 to 22, or from 38 per cent to 59 per cent. The amount spent on cars and trucks and charged to living expenses increased from $13 per family in 1944 to $35 per family in 1950.

The average value of houses for the 37 farms increased from $374 in 1944 to $898 in 1950. If the 1950 values are deflated to 1944 values by the building materials index for Western Canada 1/ a physical increase of 29 per cent is indicated. The average value of household goods increased from $211 in 1944 to $551 in 1950. Again, if the 1950 values are deflated to 1944 values 2/ a physical increase of about 58 per cent is indicated in household goods.

Table 33.- Average Family Cash Living Expenses, 37 Farms in the Athabasca Area, Alberta, 1944 and 1950

	Dollars		Per Cent	
	1944	1950	1944	1950
Groceries, fruit and meat	270	507	44	41
Fuel and light	4	26	1	2
Maids hired	-	1	-	-
Auto and truck (share charged to living)	13	35	2	3
Life insurance	1	-	-	-
Personal	78	186	13	15
Education	24	74	4	6
Church and charity	6	37	1	3
Health	56	102	9	8
Clothing	131	214	22	17
New furnishings	23	64	4	5
Total family cash living expenses	606	1,246	100	100

Farm produce used on the farm has also increased in quantities on a per family basis. Use of milk per family increased by 20 per cent, cream by 22 per cent and butter by seven per cent, while egg consumption decreased

1/ Dominion Bureau of Statistics, Price Index Numbers of Commodities and Services Used by Farmers (Western Canada), Building Materials Index (176.5 and 330.0).

2/ Clothing and Household Equipment Index, April 1945 to April 1951 (130.5 and 216.3).

by eight per cent. Total value of farm produce used on the farm increased from $284 in 1944 to $451 in 1950.

Cash family living expenses increased from $606 in 1944 to $1,246 in 1950, an increase of about 106 per cent. In the same period the farm family living costs index increased from 123.4 to 199.1 in April 1951, 1/ an increase of about 61 per cent. It would appear that there has been an increase in consumption of these goods and services as well as in household goods.

If the money spent on bare necessities such as groceries, fruit, meat clothing and health, as a proportion of total cash family living expenses decreases, level of living will have increased. The amount spent on these items was 75 per cent of the total in 1944 and 66 per cent in 1950. Fuel is not considered as a necessity in settlement areas where abundant quantities of wood are available for heating.

These figures on level of living indicate an increase in consumption per family unit. The size of family at the same time has not changed significantly. The total number of adult months per family per year decreased slightly from 38.3 adult months in 1944 to 37.3 adult months in 1950. It would appear then that there has been some increase in the level of living and that the increase in earnings has not all been allocated to farm capital expenditures.

Expenditures for family living may be derived from non-farm income as well as from farm income. Non-farm receipts may be an important source of income for savings and family living in newly settled areas, and may be of particular importance to small farms with a low level of farm production. In the Athabasca area, however, non-farm receipts amounted to only $78 per farm for small farms in 1944 as compared to $126 per farm for the larger sized farms. In 1950, non-farm receipts averaged $253 for small farms and $650 for large farms. The greater non-farm receipts per farm in 1950 were due mainly to Family Allowance and Prairie Farm Assistance payments.

1/ Dominion Bureau of Statistics, Price Index Numbers of Commodities and Services Used by Farmers (Western Canada).

SUMMARY

This study describes the changes in farm organization that took place in the Athabasca region of northern Alberta. It is based on a study of 37 farms which were visited in 1945 and re-visited in 1951 when details of the previous year's business were obtained in each case. Farming in the region is typical of the farm business in much of the grey-wooded soils in the north of the province.

1. The average size of farm increased from 210 acres in 1944 to 238 acres in 1950. At the same time, cultivated acreage per farm increased from an average of about 94 acres to 152 acres for the farms included in the study. There was a greater increase in cultivated acreage on the smaller farms than on the larger units. The rate of land improvement during the period was about double the rate that prevailed in the ten years preceding 1944.

2. A significant decline in the average size of the livestock enterprise occurred during the period under study. As may be expected, the number of horses declined about 51 per cent; the number of sheep declined by 55 per cent, while the numbers of hogs declined by 35 per cent and cattle by 15 per cent. Poultry numbers also declined slightly. The average farm in 1950 therefore had the equivalent of about six mature cattle, one sheep and one hog at that date.

3. All 37 farmers in the sample were land-owners in 1944; there was no renters and only one part-owner. In 1950 three of these were classified as part-owners, each one having a homestead lease in addition to owning the home quarter. The remainder were owners.

4. Over the period there was a considerable increase in the amount of machinery on these farms. The machinery on the average farm in 1945 was valued at about $1,300 and in 1951 at $4,425 (year-end inventory).

5. In line with the decline in the numbers of livestock and the increased amount of machinery, there was a tendency to increased production of wheat and legume seed during the period, with a decline in the acreage of other grains and hay.

6. In 1944 cash receipts on the average farm amounted to $1,300; in 1950 total receipts averaged $2,625. In the corresponding years the cash expenses were $454 and $1,030 respectively. For the two years under comparison the average net cash farm income was $846 in 1944 and $1,595 in 1950.

7. In the period 1944 to 1950 the farmers in the sample increased their net worth by an average of $1,246 per year.